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TA-55 Radiological Protection Requirements

Gerald L. George (Jerry)

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Course Objective

- Objective - Perform FMH activities according to RP requirements
- To help meet the objective, the following topics are covered in this presentation:
 - Working in RCAs at TA-55
 - CAMs and Contamination Monitors
 - Contamination Control Philosophy at TA-55
 - External Radiation Control Philosophy at TA-55
 - As Low As Reasonably Achievable (ALARA)

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Course Objective

- Previous Slide – boiler plate for training purposes
 - As fissile material handlers you should already know the RP requirements for TA-55 pretty well, but may not know the reasoning/madness of why the requirements are established the way they are!
 - The real objective is to help explain the reasoning and/or purpose of RP requirements at TA-55
 - Hopefully, if know the reasoning behind the requirements, it will help you implement the them on a day-to day basis.

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Working in RCAs at TA-55

- High Hazard Radiological Work
 - Requires a work authorizing document approved by an RP SME **AND** an RWP
 - Definition from P121
 - Work that could contaminate uncontrolled areas or the environment
 - Work in (or likely to create) a high contamination area
 - Work in (or likely to create) an airborne radioactivity area with levels >40 derived air concentration (DAC)
 - Work in areas where the dose rate >1 rem/hr
 - Work expected to create uncharacterized radiological conditions including:
 - Working outside engineered controls
 - Breaching engineered containment systems

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Working in RCAs at TA-55

- Moderate Hazard Radiological Work
 - Requires a work authorizing document approved by an RP SME
 - Definition from P121
 - Work in areas where the dose rate is >5 mrem/hr and <1 rem/hr
 - Work in a contamination area or performing activities that could likely result in creating a contamination area
 - Work in an airborne radioactivity with levels <40 DAC or performing activities that could likely result in such conditions

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Working in RCAs at TA-55

- What is the hazard grading for the below work?
 - Window Changes?
 - Glovebox Glove Changes?
 - Bagouts?
 - Push thru HEPA filters?
 - Opening an unapproved container of RAM outside an open front hood or glovebox?
 - Working in a Radiation Area?
 - Maintenance on Wet Vac System?
 - Glovebox work
 - Retrieving Items from the vault?
- Examples of Moderate and High Hazard work are given in TA55-RD-555

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Working in RCAs at TA-55

- An RWP shall be used for entry into the following areas, irrespective of the work to be performed:
 - Radiation areas exceeding 75 mrem/h
 - High radiation areas
 - High contamination areas
 - Airborne radioactivity areas
 - Hot-job exclusion areas (except when being used during the response to a radiological emergency)
 - When indicated as a requirement on radiological entry posting

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Working in RCAs at TA-55

- Summary – You should have a better understanding of:
 - The differences between Moderate and High Radiological Work and the requirements for each?
 - When an RWP is required?
 - Why you need an RWP at TA-55 at ≥ 75 mr/h?
 - One thing I did not address is when an RCT is required, but we do a great job of this presently

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CAMs and Contamination Monitors

- Air Monitoring - the best field indicator that there is a radiological problem (my opinion)
 - ~260 Continuous Air Monitors (CAMs)
 - RCTs verify operability daily
 - Filters changed weekly
 - Alarm set point – 3 DAC-h
 - Set up to measure Pu-239, Pu-238, and Np-237 simultaneously
 - These isotopes represent the alpha energies encountered at TA-55

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CAMs and Contamination Monitors

- Air Monitoring (cont.)
 - 1600 Fixed Air Samplers (FAS)
 - Filters changed daily or weekly depending on the area
 - On a monthly basis we change ~ 7200 CAM/FAS filters

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CAMs and Contamination Monitors

- As a worker, you should become familiar with the indications of the Alpha-7L CAMs operating in your area, including:
 - A **green** light is “normal” indication for the CAM
 - An **orange** light is “trouble” indication for the CAM
 - Still operational, but an RCT is required to be contacted
 - Flashing **green**, **orange**, and **blue** light – CAM Failure
 - A **red** light – CAM alarm
 - Display of the CAM?

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CAMs and Contamination Monitors

- Elevated Alpha-7L CAM Display
 - Normally < 1.0 DAC-h
 - Any other reading indicates an elevated CAM
 - Why do we care if a CAM is elevated?
 - What do you do if a CAM is elevated?

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CAMs and Contamination Monitors

- Response to a CAM alarm with no respirator protection includes the following actions :
 - Immediately exit the area to a safe haven, i.e. PF-corridor
 - Remain in the safe haven until RCTs respond to the CAM alarm and release all personnel involved.
 - OK to exit into another laboratory space? Why or why not?

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CAMs and Contamination Monitors

- If a CAM alarms while wearing respiratory protection, then follow RCT directions.
 - Scenarios!

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CAMs and Contamination Monitors

- Actions to take for radiological instrumentation not working correctly
 - If a CAM is inoperable or its performance is suspect, immediately contact radiation protection and the Operations Center.
 - If a contamination monitor is inoperable or its performance is suspect, contact radiation protection personnel. If radiation protection personnel are not readily available, place a note on the faulty contamination monitor or probe indicating *out of service*.

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CAMs and Contamination Monitors

- Responding to a personnel contamination monitor alarm includes the following actions:
 - Remain in the immediate area if safe to do so
 - Have another worker notify radiation protection (typically, the facility or area RCT) and the Operations Center
 - Minimize cross-contamination by avoiding movement or touching any surfaces
 - Do not leave the RCA unless it is an emergency

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CAMs and Contamination Monitors

- In the previous slide did you notice it did not state, “Recount Yourself”
 - This is a huge problem with HFM-8 alarms
- Reasons for not counting yourself again?
 - Hint – think of how RCTs respond to HFM-8 alarm.
- What if your contamination monitor is not working correctly, i.e. sporadically alarming.
 - Is this acceptable?

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CAMs and Contamination Monitors

■ Summary

- Importance of CAMs and the workplace and how to recognize potential problems with CAMs
- The proper response for CAM alarms and why we respond in this manner
- The proper response to a contamination alarm and the reasoning why
- What to do if a CAM or contamination monitor is not working properly and the reasoning why.

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Contamination Control Philosophy at TA-55

- Any contamination control philosophy should simply reduce the risk of:
 - Intake of radioactive material
 - Spread of radioactive material to uncontrolled areas
 - Limit the buildup of radioactive material in the workplace
 - Limit/reduce source material that is out not contained in an engineered barrier.
- Our contamination control philosophy is easily conveyed in one simple statement?
- Ideas?

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Contamination Control Philosophy at TA-55

- **Philosophy, “Detect the contamination closest to the source as possible!”**
- Our contamination control philosophy primarily is achieved by the following RP requirements:
 - **Personnel Monitoring Requirements**
 - Routine Monitoring Instructions (RMIs)
 - Radiation Protection Observations (RPOs)

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Contamination Control Philosophy at TA-55

- Personnel Monitoring Requirements
- Whole body survey of personnel required to be performed by RCT:
 - Exiting from posted Contamination, High Contamination, or Airborne Radioactivity Areas
 - Completion of “hot jobs” e.g. window change, glove change, etc.
 - Outer set of PPE surveyed with hand-held instrument (Ludlum Model 139)

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Contamination Control Philosophy at TA-55

- Personnel Monitoring Requirements
 - Whole body survey performed by the operator on his or her PPE is required when prior to exiting RBA *after*:
 - Performing work in glovebox gloves
 - Performing “hands-on-work” on the exterior of gloveboxes
 - Work involving handling or opening radioactive material, handling containers of radioactive material, handling contaminated items or equipment
 - Any work that required kneeling, leaning against or sitting on surfaces in the RBA (except chair)
 - Survey is performed by a with Ludlum Model 214 or Model 215

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Contamination Control Philosophy at TA-55

- Personnel Monitoring Requirements - Summary
 - If an individual enters an RBA, the minimum monitoring requirements are
 - Twice on automated HFM-8 with booties on
 - Once on the PCM-2 with anti-c coveralls or labcoat on
 - IF work performed in an RBA, THEN a full body frisk is also required
 - If an individual enters an RCA, the minimum requirements are
 - Once on automated HFM-8 with booties on
 - Once on the PCM-2 with anti-c coveralls or labcoat on

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Contamination Control Philosophy at TA-55

- TA-55's exit monitoring requirements are different than a number of sites for one reason:
 - *PPE is required to be surveyed prior to exiting an area to another area*
- Vital personnel monitor correctly out of areas in order to help achieve our contamination control philosophy,
 - **“Detect the contamination closest to the source as possible!”**

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Contamination Control Philosophy

at TA-55

- Importance of frisking correctly with a 2000 dpm source demo!

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Contamination Control Philosophy at TA-55

- Our contamination control philosophy primarily is achieved by the following RP requirements:
 - ~~Personnel Monitoring Requirements~~
 - Routine Monitoring Instructions (RMIs)
 - Radiation Protection Observations (RPOs)

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Contamination Control Philosophy at TA-55

- RMIs are completed at specific frequencies to meet compliance requirements
 - Graded approach used to determine frequencies
 - Philosophy on frequency – focus on the radioactive material source and work out
- Reviewed and approved annually
 - During annual review, Radiation Protection Observations (RPOs) are reviewed to determine if revisions in frequency are required

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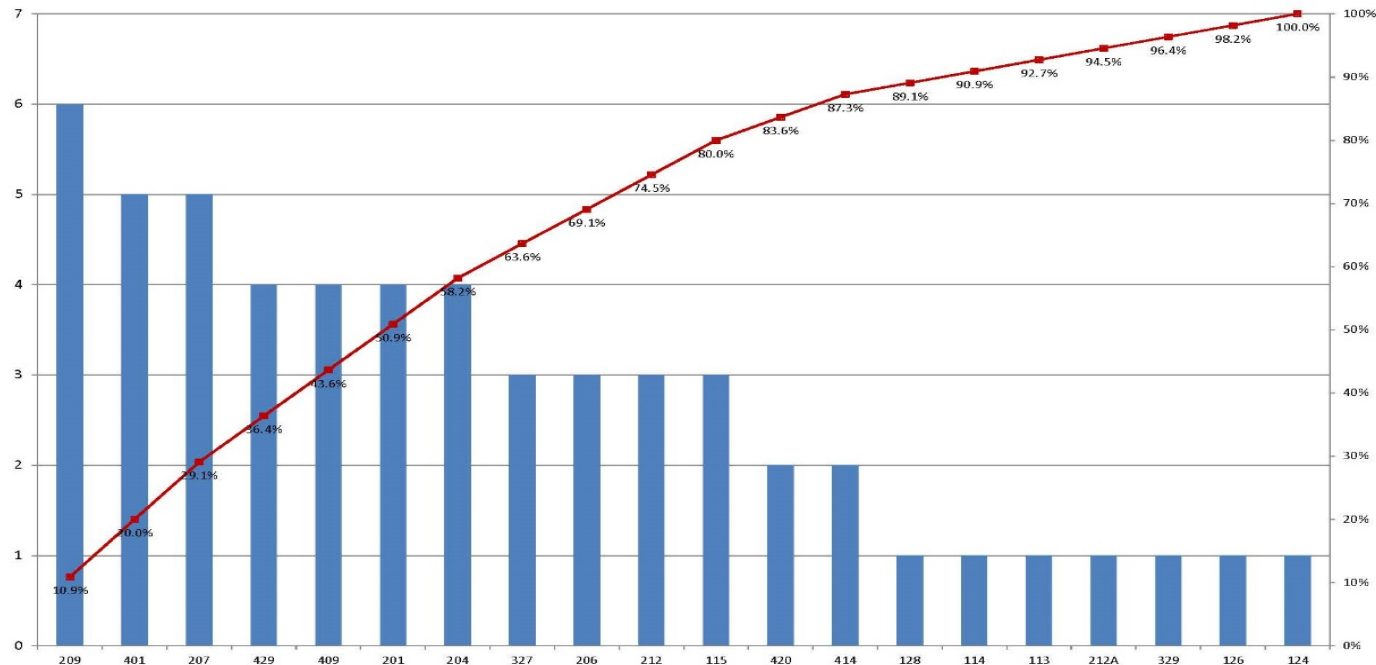
Contamination Control Philosophy at TA-55

- RPOs
 - Electronic system that tracks radiological incidents or occurrences.
 - Ability to organize data by event type, location, or time.
 - Used primarily to generate RadCon Performance Metrics and establish RMI frequencies

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Contamination Control Philosophy at TA-55

Pareto Chart: TA-55 RBA: Mar-15 TO Feb-16



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Contamination Control Summary

- Very good idea on what our contamination control philosophy is and why self-monitoring is so important
- How RMIs and RPOs are used to help implement the contamination control philosophy
- Why we monitor our anti-c's when other sites don't!

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External Radiation Control Philosophy

- PF-4 is posted as a radiation area – Why?
- Laboratory spaces on the first floor that contain radiation areas have a map on the main entrance into the space that denotes the radiation areas within the room and the associated dose rates.
- Radiation areas ≤ 75 mrem/h at 30 cm are denoted with stanchion and Radiation Area Posting that denotes the highest dose rate in the area
- Radiation areas ≥ 75 mrem/h at 30 cm are denoted with physical barrier in addition to the stanchion and radiological posting. In addition an EPD is required to enter these areas.

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External Radiation Control Philosophy

- A map with the dose rates associated with the vault are posted in the vault vestibule area and are required to be reviewed prior to entering the vault to perform work.
- Future improvements: Color coded system that delineates dose rate ranges.

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External Radiation Control Philosophy

- It is every workers' responsibility to know
 - The dose rates he or she are working in and
 - If RAM is moved that potentially could create a new radiation area or significantly change a radiation area that is already posted – *contact an RCT*.
- If you are not sure of the dose rates you are working in – contact an RCT

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As Low As Reasonably Achievable. (ALARA)

- We all know the basic tenants of ALARA and how we implement:
 - Time, Distance, and Shielding
 - In regards to implementation, everyone of us can improve.
 - For example, have you ever seen 2 people carrying on a conversation in a laboratory space in a posted Radiation Area that had nothing to with work or the task at hand.
 - Examples: Recent CRA's .

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As Low As Reasonably Achievable. (ALARA)

- ALARA Working Team
 - Members of ADPSM – mainly technicians
 - Management Champion
 - Charter is on documentum
 - The purpose of the AWT simply put is to review operations out in the field and make recommendations on how to keep doses ALARA.

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Done at Last!

Questions?

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